
**Movements between Foreign Exchange Rates and Bank Interest Rates in Kenya:
Analytical Approach**

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Abstract. The study sought to analyze the movements between foreign exchange rates and bank interest rates in Kenya. Secondary data was utilized in the study. The data on foreign exchange rates and interest rates for the period covering January 2006 and December 2010 were obtained mainly through document reviews. The data was analysis using multivariate regression. It was established that foreign exchange rates had a significant relationship with bank interest rates. The study further concluded that the movement between the Euro and Bank Deposit Rate was positive and significant. The movement between the US Dollar and Bank Deposit Rate was positive but not significant while the movement between the pound and Bank Deposit Rate was inverse and significant.

Key words: Fluctuations, Deposit, Rates, Currency

Introduction

Traditional theories define interest rate as the price of savings determined by demand and supply of loanable funds. Assuming the existence of a capital market, interest rate is the point at which savings are equal to investment. The loanable fund theory argues that interest rate is also influenced by non-monetary factors. It assigns no role to quantity of money or level of income on savings, or to institutional factors such as commercial banks and the government (Obura & Anyango, 2016).

The liquidity theory, on the other hand, explains that interest rate as amount paid for regret experienced for having to part with an asset whose liquidity is very high. It is a price that equilibrates the desire to hold wealth in the form of cash with the available quantity of cash, and not a reward of savings. Interest rate is relates to income. Its primary role is to help organize financial resources to help in the efficient utilization of resources for economic growth and development (Ngugi & Kabubo, 1998).

Bank deposit rates was considered as the main dimensions of interest rates in the present study. Bank deposit rate is amount of money paid out in interest on cash deposits, savings and other investment accounts (Leader Investment Kenya, 2007).

Exchange rate is the price of one country's currency expressed in another country's currency. In other words, it is the rate at which one currency can be exchanged for another. It is the process of trading the currency of one country for the currency of another (Obura & Anyango, 2016)

Exchange rate is a global political, social and economic indicator which reacts quickly to global shocks including movements in interest rate. Foreign exchange rate has an effect on the country's economy as well as individual firms (Mumcu, 2005).

From the analysis of previous studies both positive and negative relationship between exchange rates and interest rates has been observed, which came as the result of the inflation shock during this period (Hakkio, 1996).

Interest rates, together with inflation rate, are among the most significant factors affecting exchange rate fluctuations. Positive movement in a domestic interest rate can increase the number of home currency deposits leading to higher rates of return, hence, high demand for home currency (Jonada, 2015).

Objective of the Study

The objective of the study was to analyze the movements between foreign exchange rates and bank interest rates in Kenya.

Empirical Literature Review

Noor (2011) studied the effect to changing of Rupiah's Exchange Rate to American Dollar by three factor of economic using multiple regression and concluded that there was no significant effect on exchange rate if inflation rate, interest rate and money supply is used partially. Moreover, the study established that besides inflation rate, interest rate and money supply have an effect on changing of exchange rate.

Goldfajn and Baig (1998) conducted a research aiming to find a relationship between real interest rate and real exchange rate with a sample of data about daily interest rates and exchange rates from July 1997-1998 in Asian countries. The findings indicated a weak relationship. This finding contradicted Hakkio (1996) who observed that during 1980s, there was a positive correlation between interest rates and dollar price.

Goldfajn and Gupta (1999) studied the linkage between exchange rates and interest rates on 80 currency crises from 1980 until 1998 in the international area and found that an increase in interest rates will result in an appreciation of nominal exchange rates.

Jyoti and Alain (2000) failed to establish any consistent causality relationships between interest rate, exchange rate and stock market index.

Methodology

Secondary data was utilized in the study. Monthly data on; Bank deposit rate, Euro, Pound and US dollar exchange rates; for the period covering January, 2006 and December, 2010 were obtained through document reviews. To use multiple regression model, time series properties of data was investigated.

Model Specification

The multiple regression model was of the form:

$$IR_t = \beta_0 + \beta_1(USD/KShs)_t + \beta_2(EUR/KShs)_t + \beta_3(BP/KShs)_t + \varepsilon_t \quad (1)$$

Where:

IR – Bank Interest Rate measured by Average deposit rate at month t .

$(USD/KShs)_t$ – Exchange rate between the dollar and the Kenya shillings at time t .

$(EUR/KShs)_t$ – Exchange rate between the Euro and Kenya shillings at time t .

$(BP/KShs)_t$ – Exchange rate between the sterling pound and the Kenya shillings at time t .

$\beta_0 \beta_1 \beta_2 \beta_3$ are the constants to be estimated.

ε_t – the error term.

Testing for Non-Stationarity

Formal investigation for non-stationarity was done through Augmented Dickey Fuller (ADF) test and the resulting test statistics compared to the critical values. The rule of the thumb is that the series is rejected if the ADF statistics exceeded the critical value otherwise it is accepted.

Table 1 reports the results of Augmented Dickey Fuller test of unit root as tested at level as well as in the first difference.

Table 1: Results of Unit Root investigation (ADF Test)

Variable	ADF Test	Test Statistic	5% Critical value
Average Deposit Rate	At Levels	-1.197500	-2.911730
	First Difference	-7.172085	-2.912631
Euro	At Levels	-1.697450	-2.911730
	First Difference	-7.175227	-2.912631
Pound	At Levels	-1.991288	-2.911730
	First Difference	-7.430079	-2.912631
Us dollar	At Levels	-1.369108	-2.911730
	First Difference	-5.750587	-2.912631

Source: Research data, 2013

From Table 1, ADF statistics reported that all the variables under consideration contained unit root at level, as ADF statistics did not exceed 5% critical values i.e. they were all non stationary at level. They however became stationary in first difference.

Johansen's Test for Co integration

Johansen co integration technique was applied and results obtained were presented in Table 2.

Table 2: Results of Johansen's Co integration Test

Variable	Eigen Values	Trace Stat	5% Critical value
Euro	0.16815	12.7083	15.41
	0.0302	2.0302	3.76
Pound	0.18839	13.7776	15.41
	0.02840	1.6713	3.76
US Dollar	0.05269	4.6049	15.41
	0.02840	1.4656	3.76

Source: Research data, 2013

Dependent Variable: Interest Rate

The trace statistics (likelihood ratio) for the dollar, pound and Euro exchange rates did not exceed the 5% critical value, indicating no co-integration between interest rates and exchange rates. This finding supports Reilly (1997).

Testing for Multicollinearity

Multicollinearity between the independent variables was conducted and results presented in Table 3 below.

Table 3: Multicollinearity Results for the Independent Variables

Variable	Auxiliary R ²	VIF
Average Deposit Rate	0.079	1.049
Euro	0.373	1.536
Pound	0.322	1.431
US Dollar	0.176	1.231

Source: Research data, 2013

The data had no issues of multicollinearity due to the established small values of the R² and the VIF for all the variables.

Testing for Autocorrelation

The Durbin-Watson statistic for each variable was used to test for the presence of autocorrelation. Table 4 reveals that all the variables had no cases of autocorrelation.

Table 4: Results of Autocorrelation Test

Variable	Durbin-Watson Stat.	Conclusion
Euro	2.012	No autocorrelation
Pound	1.921	No autocorrelation
US Dollar	1.862	No autocorrelation

Source: Research data, 2013

Testing for Heteroskedasticity

Data was also checked for constant variance in the error term through heteroskedasticity. The results were presented in Table 5.

Table 5: Results of the Heteroskedasticity Test

Variable	Chi2(1)	Prob >Chi2
Average Deposit Rate	0.01	0.9151
Euro	0.071	0.2675
Pound	0.081	0.3691
US Dollar	0.11	0.7438

Source: Research data, 2013

Table 5 revealed that the chi2 (1) statistics for all the variables were not significant. This implies that these variables had no heteroskedasticity.

Results

Results presented in Table 6 showed that the three major foreign exchange currencies together explained 62.2% of the variance in interest rates (Adj. $R^2=.622$). The Durbin-Watson statistic of 2.394 indicated that the residuals of the exchange rates were uncorrelated.

Table 6: Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.801 ^a	.641	.622	.20739	2.394
a. Predictors: (Constant), Dollar, Pound, Euro					
b. Dependent Variable: Deposit Rate					

From the ANOVA table presented in Table 7, the F-test was significant ($F_{0.01; 3, 56}=33.320$, $p<0.01$) indicating that the hypothesized model was statistically adequate. Thus, the multiple regression equation was a better predictor of Bank Deposit Rate.

Table 7: ANOVA Results of the Suitability of the Proposed Model

Table 7: ANOVA Results of the Sustainability of the Proposed Model						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.299	3	1.433	33.320	.000 ^b
	Residual	2.409	56	.043		
	Total	6.708	59			
a. Dependent Variable: Deposit Rate						
b. Predictors: (Constant), Dollar, Pound, Euro						

Table 8 indicates that the Euro ($\beta_1 = 0.490$, $p < 0.05$) was positive and significant predictor of Bank Deposit Rate, and US Dollar ($\beta_3 = 0.121$, $p > 0.05$) was positive but not significant predictor of Bank Deposit Rate and the pound ($\beta_2 = -0.322$, $p < 0.05$) was negative and significant predictor of Bank Deposit Rate.

Table 8: Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.672	1.003		3.660	.001
	EURO	.022	.005	.490	4.739	.000
	POUND	-.015	.005	-.322	-3.134	.003
	DOLLAR	.007	.006	.121	1.150	.255
a. Dependent Variable: Deposit Rate						

Moreover, the regression equation revealed that a unit standard deviation increase in the exchange rate for Euro would lead to increase the standard deviation of the Bank Deposit Rate by 0.490. Similarly, a unit standard deviation increase in the exchange rate for the Pound would result in a 0.322 decrease in the standard deviation of the Bank Deposit Rate while unit standard deviation increase in the exchange rate for the US Dollar would lead to 0.121 standard deviations decrease in Bank Deposit Rate. The findings that exchange rates significantly influence interest rates supports the findings by Noor (2011), Hakkio (1996), Goldfajn and Gupta (1999) and Jyoti and Alain (2000).

Conclusion

The study sought to analyze the movements between foreign exchange rates and bank interest rates in Kenya. It was established that foreign exchange rates had a significant relationship with bank interest rates. The study further concluded that the movement between the Euro and Bank Deposit Rate was positive and significant. The movement between the US Dollar and Bank Deposit Rate was positive but not significant while the movement between the pound and Bank Deposit Rate was inverse and significant.

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